UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/779,769	02/07/2001	Venkat Easwar	LS/0012.00	4642

8791 7590 01/26/2007

BLAKELY SOKOLOFF TAYLOR & ZAFMAN
12400 WILSHIRE BOULEVARD
SEVENTH FLOOR
LOS ANGELES, CA 90025-1030

EXAMINER	
NGUYEN, LUONG TRUNG	
ART UNIT	**PAPER NUMBER**
2622	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	09/779,769	EASWAR ET AL.	
	Examiner	Art Unit	
	LUONG T. NGUYEN	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10,12-23 and 25-52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,12-23,25-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/21/2006 has been entered.

Response to Arguments

2. Applicant's arguments filed on 12/21/2006 have been fully considered but they are not persuasive.

In re page 14, Applicant argues that Li and Anderson1 fail to describe the various prioritized compression technique performed by the first and second compression modules, as claimed by the applicants.

In response, regarding claim 41, noted that the feature "the various prioritized compression technique performed by the first and second compression modules" is not recited in the claim. Instead, the Applicant amended claim 41 with limitation "wherein the temporarily compressing at least some of the digital images operates as a high-priority thread in the multithreaded execution environment." The Examiner considers that claim 41 as amended does not distinguish from Li and Anderson1 (US 6,020,920) in view of Anderson2 (US 5,790,878).

Anderson2 discloses a digital camera, which utilizes multiple software routines running with a multi-threading environment to perform various steps of capturing, processing, compressing and storing the image data (column 1, lines 25-35).

In re pages 15-16, Applicant argues that Anderson2 is completely silent as to thread priorities, how those various priorities impact the execution of the threads, and how various compression techniques are handled within prioritized threads.

In response, regarding claim 41, noted that claim 41 does not recite the feature "how those various priorities impact the execution of the threads, and how various compression techniques are handled within prioritized threads."

In re page 15, Applicant argues that Applicants that Li fails to describe whether or not the "other techniques" are included in the camera device, when the other techniques occur, or how the other techniques are triggered.

In response, noted that Li discloses a digital camera which captures and converts images into embedded bitstreams; the images are initially stored as high quality images at low compression ratios (column 1, lines 40-46); then Li discloses that compression ratios can be changed by using other compression techniques (column 3, lines 5-14). Therefore, the Examiner considers that Li does disclose the "other compression techniques" are included in the digital camera.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-4, 5-7, 12-13, 15-21, 24, 29-34, 38-39, 41-44, 45-47, 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (US 6,463,177) in view of Anderson (US 6,020,920) further in view of Anderson et al. (US 5,790,878).

Regarding claim 41, Li et al. discloses a digital camera device (camera 20, figure 2, column 3, lines 40-45) with improved latency time between acquiring pictures, the device comprising an image buffer to store digital images (memory 12, figure 2), a user-activated button, integrated into the digital camera device, for generating a user request to capture a sequence of digital images at the digital camera device, said digital images being stored in the image buffer upon capture (inherently included in digital camera 19, figure 2, for capturing images and storing images in memory 12); a first compression module, embodied within the digital camera device, for temporarily compressing, with a relatively fast compression technique, at least some of the digital images upon capture, thereby freeing up available storage in said image buffer (images #1, #2, #3 are encoded into embedded bitstreams, each image can be truncated at the end to make room for additional images, figures 1-2, column 3, lines 1-14); a decompression module, embodied within the digital camera device, for decompressing the digital images that were temporarily compressed (the stored images are decoded, column 3, lines 1-14); a second compression module, embodied within the digital camera device, for compressing the decompressed digital images that were temporarily compressed more thoroughly than that provided by said first compression module, prior to storing the image in a non-volatile memory (the stored images are reencoded at the higher compression ratio, column 3, lines 1-14).

Li et al. fails to specifically disclose a buffer to store a temporarily compressed image. However, Anderson ('920) teaches a digital camera includes RAM disk 532 for storing compressed image data (figures 3, 4A, column 5, lines 32-45). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Li et al. by the teaching of Anderson in order to store image data before displaying or transmitting to another device.

Li et al. and Anderson ('920) fail to specifically disclose wherein the temporarily compressing at least some of the digital images as a high-priority thread in the multithreaded execution environment. However, Anderson et al. teaches a digital camera, which utilizes multiple software routines running with a multi-threading environment to perform various steps of capturing, processing, compressing and storing the image data (column 1, lines 25-35). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Li et al. and Anderson ('920) by the teaching of Anderson et al. in order to perform various steps of capturing, processing, compressing and storing the image data.

Noted that Li et al. discloses the stored images are decoded (decompression module, column 3, lines 1-14), this means that the stored images have been compressed then decompressed. And noted that Anderson et al. discloses a digital camera, which utilizes multiple software routines running with a multi-threading environment to perform various steps of capturing, processing, compressing and storing the image data (column 1, lines 25-35). Therefore, the feature "to defer said decompression of the digital images until high priority tasks (corresponds to encoding, decoding requantizing in Li et al., column 3, lines 1-14) in the high-

priority thread have been processed by the digital camera device" is inherently included in Li et al. and Anderson et al.

Regarding claim 42, Li et al. discloses said first compression module employs a relatively-fast compression technique that requires fewer processing resources for completion than a relatively-thorough compression technique employed by the second compression module (the stored images are reencoded at the higher compression ratio, column 3, lines 1-14, column 2, lines 42-49).

Regarding claim 43, Anderson et al. discloses said digital camera device supports multithreaded execution and wherein said second compression module employs a compression technique that operates as a background execution thread (column 1, lines 25-35).

Regarding claim 44, Anderson et al. discloses said background execution thread comprises a low-priority thread that is executed by a microprocessor of the digital camera device (column 1, lines 25-35, the image data is compressed after capturing and processing; therefore, the compression is considered as a low-priority thread).

Regarding claims 3-4, claims 3-4 are method claims of apparatus claims 43-44, respectively, therefore, see Examiner's comments regarding claims 43-44, respectively.

Regarding claims 5-6, 45-46, Li et al. discloses said sequence of digital images

comprises successive pictures rapidly captured at the digital camera device, and the digital images of the sequence are captured within a few seconds time (Li et al. discloses that image # 1, image #2,..., image #n are captured and encoded into embedded streams and stored in memory 12 (figures 1-2, column 3, lines 1-15).

Regarding claims 7, 47, Li et al. discloses the digital images that have been compressed using the second compression module are stored on a media device (the recompressed images are store in memory 12, figure 2, column 3, lines 10-14).

Regarding claims 15, 52, Li et al. fails to specifically disclose a RAM buffer for storing a given digital image that has been temporarily compressed. However, Anderson teaches a digital camera includes RAM disk 532 for storing compressed image data (figures 3, 4A, column 5, lines 32-45). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Li et al. by the teaching of Anderson in order to store image data before displaying or transmitting to another device.

Claim 1 is a method claim of apparatus claim 41. Therefore, see Examiner's comments regarding claim 41.

Regarding claim 2, Li et al. discloses said relatively-fast compression technique requires fewer processing resources for completion than said relatively-thorough compression technique (column 3, lines 1-14).

Regarding claim 12, Li et al. discloses the relatively-thorough compression technique produces a smaller-sized compressed image file for a given digital image than that produced by the relatively-fast compression technique (Li et al. discloses the recompression is at the higher compression ration than at the compression (encode), column 3, lines 1-14, this indicates the size of recompressed image is smaller than the size of encoded image).

Regarding claim 13, Li et al. discloses the relatively-fast compression technique requires less compression time when compressing a given digital image than that required by the relatively-thorough compression technique ((Li et al. discloses the recompression is at the higher compression ration than at the compression (encode), column 3, lines 1-14, this indicates the time required at the compression (encode) is less than the time required at the recompression).

Regarding claim 16, Li et al. discloses after a given digital image is temporarily compressed, storing a compressed file of that digital image back in the image buffer (column 3, lines 1-14).

Regarding claim 17, Li et al. and Anderson fail to specifically disclose after a given digital image is temporarily compressed, deleting the given digital image's original copy from the image buffer. However, Li et al. discloses nonselected images in memory 12 are truncated to make room for newly acquired images (column 3, lines 30-38). It would have been obvious to

include the deleting the given digital image's original copy from the image buffer into the device in order to make room for newly acquired images.

Regarding claim 18, Li et al. fails to specifically disclose after a given digital image is temporarily compressed, performing substeps of storing a compressed file of that digital image in a RAM buffer, and transferring the compressed file from the RAM buffer to flash memory. However, Anderson teaches a digital camera, in which the compressed file of image data is stored in RAM 532 and then transferring to removable memory 354, which is a flash disk (figures 3, 4A, column 5, lines 1-15, 32-47). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Li et al. by the teaching of Anderson in order to store image data before displaying or transmitting to another device.

Regarding claim 19, Li et al. and Anderson do not disclose said transfer step occurs when the RAM buffer is nearly exhausted. However, it is well known in the art that when the RAM buffer is nearly exhausted, the images are transferred to another device such as memory card in order to have space in buffer for storing another captured images.

Regarding claim 20, Li et al. and Anderson do not disclose said transfer step occurs when the user is no longer requesting capture of a sequence of digital images. However, the transferring of images occurs when the user is no longer requesting capture of images is well known in the art.

Regarding claim 21, Li et al. discloses the recompression is at the higher compression ration than at the compression (encode), column 3, lines 1-14, this indicates the latency of digital camera device is decreased.

Regarding claims 29-31, Li et al. and Anderson fail to specifically disclose deferring applying said relatively-thorough compression technique to the digital images during periods of time when the user is providing additional input. However, it is well known in the art to defer applying compression to the digital images during periods of time when the user is providing additional input in order to obtain quality captured images.

Regarding claim 32, Li et al. discloses said step of decompressing any of the compressed digital images that were temporarily compressed restores the digital images to their approximate pre-compression state (column 3, lines 1-14).

Regarding claim 33, Li et al. and Anderson fail to specifically disclose said relatively-fast compression technique includes lossy compression technique. However, Official Notice is taken that it is well known in the art to apply a lossy compression technique in an image compression technique in order to achieve a greater compression ratio.

Regarding claim 34, Li et al. and Anderson fail to specifically disclose said relatively-thorough compression technique includes lossy compression technique. However, Official

Notice is taken that it is well known in the art to apply a lossy compression technique in an image compression technique in order to achieve a greater compression ratio.

Regarding claim 38, Li et al. and Anderson fail to specifically disclose said relatively-fast compression technique provides about 1:4 compression. However, Li et al. disclose the compression ratio can be changed (column 3, lines 1-14). Therefore, it is a matter of design choice to have compression ratio of 1:4.

Regarding claim 39, Li et al. and Anderson fail to specifically disclose said relatively-thorough compression technique provides about 1:20 compression. However, Li et al. disclose the compression ratio can be changed (column 3, lines 1-14). Therefore, it is a matter of design choice to have compression ratio of 1:20.

5. Claims 8-10, 14, 40, 48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (US 6,463,177) in view of Anderson (US 6,020,920) and Anderson et al. (US 5,790,878) further in view of Fukuoka (US 6,104,430).

Regarding claim 48, Li et al., Anderson and Anderson et al. fail to specifically disclose a communication means for transferring the compressed digital images to another device. However, Fukuoka teaches a digital camera includes I/O card 15 which functions as a modem connected to an on-line service (figures 3, 6, column 3, line 64 – column 4, line 15). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Li et al., Anderson and Anderson et al. by the teaching of Fukuoka in

order to provide a digital electronic camera which is capable of both receiving and transmitting images and commands through the communication interface (column 1, line 62-64).

Regarding claim 49, Fukuoka discloses the compressed images are transferred using wireless communication (column 3, line 56 – column 4, line 2).

Regarding claim 50, Fukuoka discloses the compressed images are transferred using wireline communication (column 3, line 56 – column 4, line 2).

Regarding claim 51, Li et al. fails to specifically disclose a flash memory for storing a given digital image that has been temporarily compressed. However, Fukuoka teaches a digital camera includes PCMCIA flash memory card 16 for storing compressed images (figure 6, column 3, lines 40-45). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Li et al. by the teaching of Fukuoka in order to store compressed images.

As for claims 8-10, see Examiner's comments regarding claims 48-50, respectively.

As for claim 14, see Examiner's comments regarding claim 51.

Regarding claim 40, Li et al. and Anderson fail to specifically disclose transmitting the compressed digital images wirelessly for remote processing to a JPEG-compatible format.

However, Fukuoka teaches a digital camera, which uses compressed format such as JPEG to compress image data and then transmit to on line server (column 5, lines 39-42, column 3, line 55 – column 4, line 8). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Li et al. and Anderson by the teaching of Fukuoka in order to store compressed images in JPEG format.

6. Claims 22-23, 25-26, 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (US 6,463,177) in view of Anderson (US 6,020,920) and Anderson et al. (US 5,790,878) further in view of Acharya et al. (US 6,154,493).

Regarding claim 22, Li et al., Anderson and Anderson et al. fail to specifically disclose capturing each digital image as a luminosity record, and applying pre-compression to each luminosity record, in preparation for compression. However, Acharya et al. teaches a compression of color images, in which each color plane channel is compressed (figure 3, column 3, lines 14-22). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Li et al., Anderson and Anderson et al. by the teaching of Acharya et al. in order to process color image.

Regarding claim 23, Acharya et al. discloses said pre-compression comprises selected of noise smoothing (blocking artifact, column 2, lines 10-16).

Regarding claim 25, Li et al. and Anderson fail to specifically disclose said relatively-fast compression technique includes discrete wavelet transformation. However, Acharya et al.

teaches a compression of color images, which applies discrete wavelet transformation (figure 2, column 4, lines 49-61). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Li et al. and Anderson by the teaching of Achaya et al. in order to allow abrupt changes, discontinuities smaller, that make edge features of images more accurately and efficiently (column 4, lines 54-58).

Regarding claim 26, Acharya et al. discloses quantization (figure 2).

Regarding claim 36, Acharya et al. discloses wherein each digital image is divisible into separate bit planes and wherein said relatively-fast compression technique includes applying compression to individual bit planes of a given digital image undergoing compression (figure 2).

Regarding claim 37, Li et al. and Acharya et al. do not disclose wherein said decompressing step includes decompressing an individual bit plane of a given digital image before decompressing other bit planes of that given digital image. However, Acharya et al. discloses compress and individual bit plane. It would have been obvious to include the step of decompressing an individual bit plane into the device in order to display the image.

7. Claims 27-28, 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (US 6,463,177) in view of Anderson (US 6,020,920) and Anderson et al. (US 5,790,878) further in view of Acharya et al. (US 6,195,026).

Regarding claim 27, Li et al., Anderson and Anderson et al. fail to specifically disclose said relatively-fast compression technique includes low-complexity entropy encoding. However, Acharya et al. discloses a method comprising entropy encoding into bits a set of data values (figure 4, column 4, lines 1-8, column 6, lines 8-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device in Li et al., Anderson and Anderson et al. by the teaching of Acharya et al. in order to store and pack the data which is suitable for transmission and subsequent decoding.

Regarding claim 28, Acharya et al. discloses run-length encoding (ZRLC, column 4, lines 60-66).

Regarding claim 35, Acharya et al. discloses high-complexity entropy coding (entropy coding, figure 4, column 4, lines 1-8, column 6, lines 8-20).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LUONG T. NGUYEN whose telephone number is (571) 272-7315. The examiner can normally be reached on 7:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID L. OMETZ can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LN
1/22/07

Luong T. Nguyen

LUONG T. NGUYEN
PATENT EXAMINER